Practice Guidelines

Diagnosing VTE: Guidelines from the American Society of Hematology

Key Points for Practice

- Pretest probability using the Wells, Geneva, or Constans score determines the need for diagnostic testing for VTE.
- A D-dimer test alone can be used to rule out VTE for patients with a low or intermediate pretest probability of PE, low pretest probability of lower extremity DVT, or low pretest probability of upper extremity DVT.
- In patients with a low or intermediate pretest probability of PE but a positive D-dimer result, a V/Q scan is recommended over CTPA, but CTPA is recommended for patients with a high pretest probability.
- Ultrasonography is recommended as the initial test for patients with a high pretest probability of lower extremity or upper extremity DVT with confirmatory testing if negative.

From the *AFP* Editors

An accurate diagnosis of venous thromboembolism (VTE) is essential to avoid morbidity and mortality from both thrombosis and unnecessary treatment. Diagnostic tests for VTE are often unreliable, with accuracy that is dependent on the probability of VTE. The American Society of Hematology has published recommendations for determining the optimal diagnostic strategy based on pretest risk.

Clinical Decision Rules

Validated clinical decision rules have been used to stratify the risk of VTE to determine whether to initiate diagnostic testing. The most widely validated rules are the Wells score for pulmonary embolism (PE) and deep venous thrombosis (DVT) and the Geneva score for PE. The Constans score has recently been validated for upper extremity DVT. The Wells score has been validated in inpatient and outpatient populations, whereas the Geneva score was validated only in an outpatient population and the Constans score was validated only in an inpatient population. No score has been validated in the assessment of recurrent VTE; therefore, diagnosis recommendations are based on expert opinion.

Recommendations

These recommendations assume that highly sensitive D-dimer results can be obtained in a timely manner and that the inconvenience and cost of D-dimer testing are acceptable to patients because additional diagnostic testing may be avoided. Suboptimal conditions may require repeat D-dimer testing. Use of age-adjusted D-dimer cutoffs in outpatients older than 50 years increases accuracy without an increase in harm.

DIAGNOSIS OF PE

The guideline panel used probability estimates, based on Wells scores, of 5% (low), 20% (intermediate), and 50% (high) as a basis for their recommendations for PE diagnosis.

For patients with low or intermediate risk, the guidelines recommend starting with a highly sensitive D-dimer assay. If the D-dimer results are negative, no further testing or treatment is needed. For positive D-dimer results, a ventilation-perfusion (V/Q) scan or computed tomography pulmonary angiography (CTPA) should be performed. A V/Q scan is preferred over CTPA to limit radiation exposure if studies can be read expeditiously and patients are likely to have diagnostic scan results. Increasing age and intrinsic lung disease increase the risk of a nondiagnostic V/Q scan. If the V/Q scan is nondiagnostic, proximal lower extremity ultrasonography or CTPA should be considered. If D-dimer testing is not readily available, a V/Q scan or CTPA may be used as initial testing.

In high-risk patients, the guidelines recommend starting the assessment with CTPA. However, a V/Q scan may be used as the first test if CTPA is unavailable or contraindicated (e.g., in patients with renal impairment or an allergy to contrast dye). A negative CTPA result should be confirmed with a proximal lower extremity ultrasound or V/Q scan (but not D-dimer testing) before ruling out PE.

In patients with suspected recurrent PE, the guideline panel recommends starting with a D-dimer assay with a low and intermediate pretest probability, followed by CTPA if

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This series is coordinated by Sumi Sexton, MD, editor-in-chief.

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the D-dimer result is positive. CTPA is recommended as the initial test in patients with a high pretest probability. If prior imaging is available, previous and current images should be compared to determine whether findings represent recurrent or residual PE.

DIAGNOSIS OF LOWER EXTREMITY DVT

The guideline panel used probability estimates, based on Wells scores, of 10% (low), 25% (intermediate), and 50% (high) as a basis for their recommendations for DVT diagnosis.

For patients at low risk, the guidelines recommend starting with a highly sensitive D-dimer assay. If the D-dimer results are negative, no further testing or treatment is needed. If results are positive, proximal lower extremity ultrasonography or whole-leg ultrasonography should be used. If D-dimer testing is not readily available, proximal or whole-leg ultrasonography may be used as initial testing.

In patients at intermediate risk, the guidelines recommend starting with proximal or whole-leg ultrasonography. No further testing is required for negative findings on whole-leg ultrasonography. However, negative results on initial proximal ultrasonography should be followed by repeat proximal ultrasonography in one week if no alternative diagnosis is identified.

In patients at high risk, the guidelines recommend starting with proximal lower extremity or whole-leg ultrasonography, with confirmation of negative results using D-dimer assay or repeat ultrasonography in one week.

In patients with suspected recurrent lower extremity DVT, the guidelines recommend starting with a D-dimer assay in those with a low pretest probability, with proximal ultrasonography to confirm positive results. Proximal ultrasonography should be performed in all patients with an intermediate or high pretest probability. If prior imaging is available, the previous and current images should be compared to determine whether the findings represent recurrent DVT. These strategies are based on expert opinion.

DIAGNOSIS OF UPPER EXTREMITY DVT

For upper extremity DVT, risk is based on the Constans score, with low risk (10%) assigned to a score of 1 point or less and high risk (40%) assigned to a score of 2 points or more.

For patients with a low pretest probability, the guidelines recommend starting with a highly sensitive D-dimer assay, with no further testing or treatment needed if negative. Positive D-dimer results should be confirmed with ultrasonography. If D-dimer testing is not readily available, ultrasonography may be used as initial testing. This strategy does not have the accuracy to completely rule out DVT, but the panel deemed it clinically acceptable.

For patients with a high pretest probability, the guidelines recommend either a D-dimer assay followed by ultrasonography or ultrasonography with repeated ultrasonography after one week. Only a negative D-dimer result with a negative ultrasound result or two negative serial ultrasound results are sufficient to rule out upper extremity DVT in high-risk patients.

Additional Best Practices

When diagnostic imaging is required, a baseline chest radiograph may identify an alternate diagnosis to account for the patient's symptoms and to assess the likelihood of obtaining a diagnostic result on a V/Q scan. Follow-up ultrasonography in patients with lower or upper extremity DVT at the time of anticoagulant discontinuation can document any residual thrombus at the end of the treatment period. This provides a baseline with which to compare subsequent ultrasound images in patients with a possible recurrence.

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Evidence rating system used? Yes

Systematic literature search described? Yes

Guideline developed by participants without relevant financial ties to industry? No

Recommendations based on patient-oriented outcomes? Yes

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